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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/710,877	08/10/2004	Christopher D. Unger	150067XT (GEMS 0249pa)	4876

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EXAMINER
YUN, JURIE

ART UNIT	PAPER NUMBER
2882	

DATE MAILED: 06/27/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/710,877	UNGER ET AL.	
	Examiner	Art Unit	
	Jurie Yun	2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 April 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-43* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *41-43* is/are allowed.

6)☒ Claim(s) *1-8,12-18,20-22 and 25-40* is/are rejected.

7)☒ Claim(s) *9-11,19,23 and 24* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 August 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. The amendment filed 4/19/06 has been entered.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-7, 14, 15, 17, 18, 20-22, 25, 26, and 32-34 are rejected under 35 U.S.C. 102(b) as being anticipated by Price et al. (USPN 6,496,564 B2).

With respect to claim 1, Price et al. disclose an imaging tube assembly comprising: a casing (Fig. 2, 40); an insert (50 – vacuum vessel) contained within said casing, within a coolant bath (32), and having a vacuum chamber; an anode (46) residing within said vacuum chamber and rotating on a shaft (74) via at least one bearing (76); and at least one seal (170) residing between said insert and said shaft, said at least one seal preventing passage of said coolant bath into said vacuum chamber.

With respect to claims 2 and 17, there is at least one pressure transition chamber coupled to said insert and said shaft, said at least one pressure transition chamber having an associated middle fluid pressure that is between an internal fluid pressure of said vacuum chamber and an external fluid pressure of said coolant bath (column 9, lines 36-49).

With respect to claims 3 and 18, the anode (46) is in a cantilever configuration with said shaft (74) relative to said insert (50).

With respect to claim 4, the shaft (74) comprises an end residing within said insert, said anode (46) is coupled to and rotating via said end.

With respect to claim 5, the insert comprises at least one side structure (Fig. 2, the part of vacuum chamber (50) which bends in looking from left to right) that protrudes within the vacuum chamber, said anode (46) rotating at an inner end of said at least one side structure.

With respect to claims 6, 7, 33, and 34, at least one side of the insert (50) is inner cooled via a cooling fluid circulating thereabout, wherein said insert is inner cooled via said cooling fluid circulating therein (column 8, lines 54+).

With respect to claim 14, the anode (46) rotates relative to the insert (50).

With respect to claims 15 and 32, there is a cathode (48) residing within the vacuum chamber (50); and a cathode-suspending member coupled to said cathode and positioning said cathode in close proximity of a target of said anode (see Fig. 2).

With respect to claims 20 and 21, the pressure transition chamber (94, 96, 102) resides between said insert (50) and said casing (40), wherein the external fluid pressure is a vacuum pressure of an outer fluid external to said casing (column 9, lines 36+).

With respect to claim 22, there is at least one seal (170) residing between said insert (50) and said shaft (74) and preventing passage of at least one gas into said vacuum chamber.

With respect to claim 25, the pressure transition chamber (94, 96, 102) resides in an orientation relative to said insert (50), said orientation selected from at least one of said pressure transition chamber residing at least partially internal to said insert and said pressure transition chamber residing at least partially external to said insert.

With respect to claim 26, the middle fluid pressure is greater than said internal fluid pressure and less than said external fluid pressure (column 9, lines 36+).

4. Claims 36-40 are rejected under 35 U.S.C. 102(b) as being anticipated by Carlson et al. (USPN 4,577,340).

With respect to claim 36, Carlson et al. disclose a method of operating an X-ray tube comprising: rotating an anode (40) within a stationary insert (50) via at least one bearing (78) external to said stationary insert; rotating said anode via a shaft (44) that is sealed with respect to said stationary insert via a rotating seal (62); and preventing passage of a cooling fluid into a vacuum chamber (60) of said stationary insert (50) via said rotating seal (column 2, lines 9-42).

With respect to claim 37, Carlson et al. disclose directly cooling said anode via said shaft (column 3, lines 27-36).

With respect to claim 38, Carlson et al. disclose transitioning pressure differential between said vacuum chamber and an external pressure of an external fluid that is external to said insert via a pressure transition chamber (column 2, lines 49-52 & column 4, lines 33-40 & column 5, lines 56+).

With respect to claims 39 and 40, Carlson et al. disclose continuously adjusting pressure with said pressure transition chamber, and activating a pump to adjust pressure within said pressure transition chamber in response to a middle fluid pressure of said pressure transition chamber (column 5, lines 56+).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 8, 12, 13, 16, 27-31, and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Price et al. (USPN 6,496,564 B2) as applied to claims 1 and 17 above, and further in view of Carlson et al. (USPN 4,577,340).

7. With respect to claims 8 and 35, Price et al. do not disclose the anode is inner cooled via a cooling fluid circulating therein. Carlson et al. disclose the anode is inner cooled via a cooling fluid circulating therein (column 3, lines 27-36). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Price et al. and have the anode inner cooled via a cooling fluid circulating therein, to provide for direct cooling means to the anode, thereby enhancing X-ray tube life.

8. With respect to claim 12, Price et al. do not disclose the at least one seal is a ferro-fluidic rotating vacuum seal. Carlson et al. disclose use of a ferro-fluidic rotating vacuum seal (column 4, line 1). It would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the insulator rings and seal rings

of Price et al. with a ferro-fluidic rotating vacuum seal assembly, to maintain a pressure differential between the outside of the vacuum chamber and the inside of the vacuum chamber, as taught by Carlson et al., thereby enhancing X-ray tube life.

9. With respect to claim 13, Price et al. do not disclose said anode comprises a coolant channel for direct and internal cooling of said rotating anode. Carlson et al. disclose an anode comprises a coolant channel for direct and internal cooling of the rotating anode (column 3, lines 27-36). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Price et al. and have a coolant channel for direct and internal cooling of the rotating anode, to provide for direct cooling means to the anode, thereby enhancing X-ray tube life.

10. With respect to claim 16, Price et al. do not disclose a pump coupled to and removing fluid from said vacuum chamber in response to a vacuum pressure signal. Carlson et al. disclose a pump coupled to and removing fluid from a vacuum chamber in response to a vacuum pressure signal (column 3, lines 54-57). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Price et al. to have a pump coupled to and removing fluid from said vacuum chamber in response to a vacuum pressure signal, to enhance X-ray tube life.

11. With respect to claims 27-31, Price et al. do not disclose a sensor detecting pressure within the pressure transition chamber and generating a vacuum pressure signal; and a controller coupled to the sensor and adjusting pressure within the pressure transition chamber in response to the vacuum pressure signal, and a pump coupled to the controller and removing fluid from the pressure transition chamber in response to

the vacuum pressure signal, wherein the pump is continuously operated to maintain the middle pressure, and wherein the pump is activated in response to the middle pressure, wherein said pump maintains said middle pressure approximately between 0 and 1 of atmospheric pressure. Carlson et al. disclose this (column 5, lines 56+ & column 4, lines 33-40 & column 5, lines 56+). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Price et al. to have a sensor detecting pressure within the pressure transition chamber, a controller coupled to the sensor and adjusting pressure within the pressure transition chamber in response to the vacuum pressure signal, and a pump, to enhance X-ray tube life.

Response to Arguments

12. Applicant's arguments with respect to claims 1-35 have been considered but are moot in view of the new ground(s) of rejection.

13. Applicant's arguments with respect to claims 36-40 have been fully considered but they are not persuasive. Applicants argue that Carlson fails to teach or suggest the separation of a vacuum chamber from a coolant bath via a rotating seal, and that the seals of Carlson separate a vacuum region 60 from shaft bearings 78, and that there is not a cooling fluid or a coolant bath that surrounds the housing or that is in contact with the seals 64, 64'. However, this is not agreed to. The fact that Carlson does not disclose a cooling fluid or a coolant bath that surrounds the housing is not relevant, as this is not claimed in any of claims 36-40. What is claimed is "preventing passage of a cooling fluid into a vacuum chamber of said stationary insert via said rotating seal." Carlson discloses a water coolant used to cool the seals (column 4, lines 17+):

> Cooling of the magnetic seal assembly 62 is provided by a coolant such as water that is introduced into the assembly at the cooling in port 70. Port 70 is in fluid communicating relationship by means of a first channel 71 with a pair of annular openings 72, diamond shape in cross-section, one in each pole piece. To permit discharge of the heated coolant, there is provided another channel 73, diametrically opposed to the first channel 71, which collects the heated liquid for discharge through cooling out port 74.

Furthermore, according to applicant's disclosure, "fluid" can also mean "room air". See for example paragraph 0035 ("The outer fluid 112 may for example be room air."), and paragraph 0036 ("...and similarly pumps fluid, such as air out of the middle chambers 104."). The rotating seals of Carlson obviously prevent passage of a cooling fluid, or room air, or air, into the vacuum chamber of the stationary insert. For these reasons, the rejection of claims 36-40 is maintained and made final.

14. Applicant's arguments with respect to claims 41-43 have been fully considered and are persuasive. The rejection of these claims has been withdrawn.

Allowable Subject Matter

15. Claims 9-11, 19, 23, and 24 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

16. Claims 41-43 are allowed.

17. The following is a statement of reasons for the indication of allowable subject matter: Prior art fails to disclose a method of operating an x-ray tube comprising: generating at least one pressure signal indicative of at least one vacuum pressure within at least one enclosure of the x-ray tube, generating an x-ray tube vacuum quality signal in response to said at least one pressure signal, and determining whether to

perform a maintenance task in response to said x-ray tube vacuum quality signal, as claimed in claim 41. Claims 42-43 are allowed due to their dependency on claim 41.

Conclusion

18. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jurie Yun whose telephone number is 571 272-2497. The examiner can normally be reached on Monday-Friday 8:30-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on 571 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jurie Yun
Examiner
Art Unit 2882

June 15, 2006

EDWARD J. GLICK
SUPERVISORY PATENT EXAMINER